

RESEARCH AT TRU:

Committed to community

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garbage to gold** 12

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by research 14

TRU RESEARCH AND GRADUATE STUDIES
2017–2018



Message from the Associate Vice-President, Research and Graduate Studies



Dr. Will Garrett-Petts, Associate Vice-President of Research and Graduate Studies.

As an open access research university, TRU boasts a comprehensive set of assets—including trades training, Open Learning, TRU World, career and vocational laddering opportunities, and outstanding faculty in all the traditional academic areas.

The interdisciplinary research potential of these assets continues to produce impressive results, including the creation of enhanced and often unique student training possibilities. On behalf of Research and Graduate Studies I am pleased to introduce this report on the continuing implementation of Thompson Rivers University's five-year Strategic Research Plan (SRP)—and to identify areas of focus for 2018-19, as we work together to sustain a vibrant research culture.

During the last year, we have engaged in a major Strategic Consultation on Research and Graduate Studies with stakeholders within TRU and among members of the larger community. The results of these discussions will help guide future decision-making and further define “research excellence” and our commitment to “research-informed learning” in terms of their relevance and impact.

Highlights drawn from the Consultation include an increasing recognition of how our success in securing federal research funding support has a cascading effect, this year felt through the allocation of two new Canada Research Chairs, two new CFI-funded labs in genomics and remote sensing, and an expansion of our Indigenous research networks; through the establishment of the University's first Industrial Research Chair (in ecosystem reclamation); through new health science funding, and continued support for ground-

breaking work in the sciences, the humanities, the social sciences, law, education and business; through national recognition for our work in undergraduate research training, an increased allocation of Canada Graduate Scholarships, and, in 2018, through the first allocation of the new British Columbia Graduate Scholarships. The Consultation further reinforced the importance of linking research to student training, the importance of partnership development and the ideals of community-driven research, the harmonization of research ethics protocols across British Columbia, a renewed research focus on social and technological innovation, increased institutional support for early-career researchers, increased research space, and a continued commitment to Indigenizing research and graduate studies at TRU. Above all, the consultations spoke to the importance of a shared strategic vision for integrating research, scholarship and creative inquiry into all areas of the university, including the development of enhanced research experience opportunities for students at all stages of their studies.

In the coming year we will be contributing to this shared vision by maintaining the level of excellence in pre- and post-grant support; by working with our partner universities to increase research opportunities; by continuing to host an impressive array of graduate supervision, grant development, and academic writing workshops; by seeking to support new graduate program development; by enhancing our undergraduate research training programming with the introduction of a new “Research Coach” program, thus expanding research-informed learning experiences to first- and second-year students; by creating new research workspaces; by hosting visiting scholars, workshops, and conferences; and by seeking to raise the profile and impact of our research.

The interdisciplinary ethos fostered by the relative absence of academic silos at TRU continues to inspire us, and our relationship to the communities we serve remains equally remarkable. The people of the Interior of British Columbia see TRU as their university; and, in the spirit of inter-institutional collaboration, we have sought to extend our reach by signing a research agreement with the University of British Columbia, Okanagan (UBCO) and the University of

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Northern British Columbia (UNBC). Together we are intent on developing complementary research partnerships with our host cities, seeking to address issues of common concern by developing research capacity with a regional lens in natural disaster management, including flood/fire/drought prediction and response, interface fuel management, evacuation management, snowpack monitoring, community health and ecosystem impacts; rural and regional health (including mental health), cannabis, social innovation and development, place promotion and tourism development; and a host of problems related to homelessness and affordable housing. The alignment of resources across institutions and communities to tackle priority issues points toward a new definition of research excellence that TRU is proud to champion.

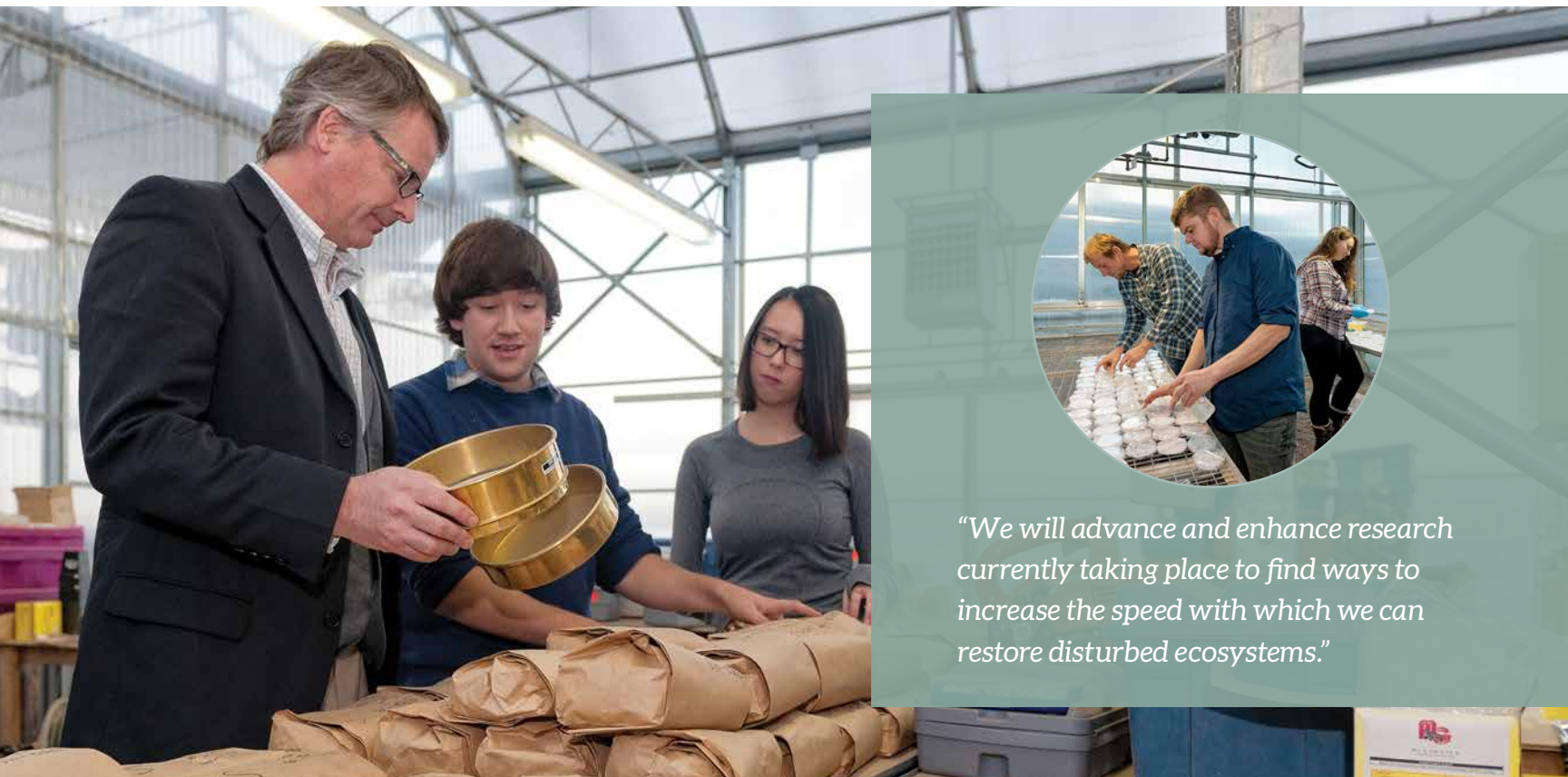
This annual report is offered as a reflection on and a celebration of the last 12 months—on how the research efforts and accomplishments of our faculty, students, and community research partners are making a difference locally, regionally, nationally and globally.

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Disturbed environments restored

We see them just about everywhere—on the sides of mountains after a logging operation has wrapped up, and in valley bottoms that have been carved out by mining—wherever we extract resources, we disturb the environment.



“We will advance and enhance research currently taking place to find ways to increase the speed with which we can restore disturbed ecosystems.”

Lauchlan Fraser with his graduate students.

Dr. Lauchlan Fraser is at the forefront of research that will aid in this recovery process, as TRU’s first ever NSERC Industrial Research Chair (IRC) in Ecosystem Reclamation. This investment, valued at more than \$2.5 million, creates a research hub for ecosystem recovery and environmental sustainability at TRU, one that supports the development of reclamation technologies, tools and protocols that can be exported globally. The establishment of an IRC at TRU provides project funding for trainees and new researchers to study soil amendments,

biodiversity and climate change in the context of ecosystem reclamation.

“We will advance and enhance research currently taking place to find ways to increase the speed with which we can restore disturbed ecosystems,” Fraser explained. “We’ll be moving into new research areas, pushing forward and expanding the envelope of our understanding.”

Partners that have supported TRU in the establishment of the IRC include Metro Vancouver, New Gold New Afton mine, Teck Highland Valley Copper mine, Genome BC, the Real Estate Foundation

of BC, Arrow Transportation, Geoscience BC, Kinder Morgan Canada, and the BC Cattlemen’s Association.

Along with these industry and community pledges, valued at nearly \$1.8 million, the IRC includes a federal investment of \$875,000, and is one of the largest research grants in TRU’s history.

Fraser, along with a dedicated team of researchers and administrators, has been building toward this initiative for three years. “I’m very grateful for all the support that TRU has provided. This has been a huge team effort.”

Research tackles treaty implementation

Modern treaties are difficult to negotiate, and are just as challenging to implement.

Dr. Janna Promislow, associate professor of law, is part of a national, five-year \$2.5 million SSHRC Partnership Grant that hopes to change this, undertaking research that aims to assist Indigenous governments, Indigenous communities and other policy makers to improve modern treaty implementation.

Principal Investigator Dr. Stephanie Irlbacher-Fox, adjunct professor at Carleton University, has gathered researchers from across Canada who will work alongside members of the Land Claims Agreements Coalition (LCAC), an organization formed by Indigenous signatories to modern treaties. Promislow was excited to join the project, given her current research interests in public law and Indigenous law and jurisdictions, and past experience working on implementing land claims in the Northwest Territories.

The project has five main themes: Indigenous relationships to land, intergovernmental relations and multilevel governance, treaty financing and fiscal relationships, implementation evaluation and socioeconomic issues, and Indigenous and settler legal systems. Promislow, working alongside Ms. Jessica Orkin and Dr. Kim Stanton, who represent the Grand Council of the Crees (Eeyou Istchee), is co-leading research on Indigenous law within modern treaty contexts, the interaction of Indigenous and settler legal systems in implementing the treaties, and how public law may need to change to work with Indigenous jurisdictions.

The grant responds to the fact that modern treaty implementation is severely under-researched, said Promislow, with some implementation disputes ending up in court.

“Capacity and resourcing for Indigenous communities is always a concern, and the partner—the Land Claims Agreements Coalition—exists out of necessity, to create support between Indigenous signatories facing implementation and other challenges” she said.

“There are so many things that have to take place to realize all of the commitments in a treaty—for example, transfers of money, surveying, transfers and registration of land and resources, setting up or reorganizing governments, establishing new co-management committees, transfers of responsibility between government departments, and ongoing inter-governmental relationships and negotiations. There have been several court cases due to problems that have developed in the course of treaty implementation.”

“Historical treaties tell us that if you don’t implement properly there are more problems down the road. Aboriginal treaties and constitutional rights do not self-implement,” she said.

“I’m excited to support the treaty communities in this work. There is a research gap that I saw a long time ago as a practicing lawyer, and I am very interested as an academic to find out what has and hasn’t happened since.”



“Aboriginal treaties and constitutional rights do not self-implement.”

—Janna Promislow

Hofmann’s latest novel “incisive and deeply satisfying”

“Karen Hofmann’s *What is Going to Happen Next* is not another gloomy Can-Lit family saga, but a familiar portrait of our neighbours and friends—maybe of ourselves—weathering the effects of far distant adversity with the same halting, human grace we all share,” wrote Jennifer Quist, author of *Sistering*.

Rave reviews have poured in for Karen Hofmann’s second novel, *What is Going to Happen Next*.

Karen Hofmann’s latest novel, *What is Going to Happen Next* pieces together the lives of four siblings who grew up in rural BC in the 1970s, but who were apprehended by social services and split up after the death of their father and the hospitalization of their mother. Place is vital in this story, as the memories of their childhood in the remote West Coast community of Butterfly Lake give way to their coming of age in Vancouver in the 1990s.

“I was excited to write about Vancouver in the 90s because it was really the last time you could live there and have a dignified life without making a lot of money,” explained Hofmann, an associate professor in English and Modern Languages.



Karen Hofmann

“These adults are trying to transcend their backgrounds, and the story is about how they make that transition, as well as about sibling bonds and the effects of social class. It explores the tension between what has happened to them and what they’ve overcome—with mixed results.”

Hofmann’s debut novel, *After Alice*, was published in 2014, and *Echolocation*, a collection of short fiction, will be published by NeWest Press in spring 2019. Her short fiction has been published in *Arc*, *Prairie Fire*, *The Malahat Review* and *The Fiddlehead*.

“An incisive and deeply satisfying novel about the muscle memory of the human heart,” wrote Sarah Mian, author of *When the Saints*.

Thompson Rivers University is grateful for the support it receives from the Research Support Fund. The Fund provides a portion of the costs associated with managing the research funded by the Social Sciences and Humanities Research Council, the Natural Sciences and Engineering Research Council, and the Canadian Institutes of Health Research.

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BC's Interior universities join forces to take research to a new level

Students at British Columbia's three Interior universities will benefit from enhanced research opportunities and increased mobility, thanks to an agreement that will be a game changer for higher education in the region.

The Interior University Research Coalition (IURC), a memorandum of understanding between the University of Northern BC (UNBC), Thompson Rivers University (TRU), and the University of British Columbia Okanagan (UBC Okanagan), is the product of more than two years of collaboration.

The IURC commits to the creation of a tri-university partnership office, whose mandate will be to explore new possibilities for talent development, facilitate research collaboration and co-ordinate joint funding proposals.

As partners, the three universities form a core of research and innovation talent in the BC Interior that will further develop the innovation ecosystem of the entire region, build and strengthen new and traditional industries, and enhance overall quality of life.

"This agreement recognizes the mutual interests our institutions have in supporting research in the province. Graduate students and researchers bring ideas, questions and solutions and can bring real benefits to communities through their collaborations," said TRU President and Vice-Chancellor Alan Shaver.

The IURC commits to the creation of a tri-university partnership office, whose mandate will be to explore new possibilities for talent development, facilitate research collaboration and co-ordinate joint funding proposals. The office is headed by Janice Larson, an expert in strategic planning with more than 22 years of experience in public policy development and implementation.

While each university contributes its own areas of expertise, co-ordination of efforts will enhance student access to equipment and mentorship across the partner institutions, help form clusters of expertise, and meet provincial and federal priorities, including fostering talent, training highly qualified personnel and driving innovation in the technology sector and all areas of the economy.

This spring, approximately 100 researchers and deans from the three universities attended the IURC's first annual symposium, which provided an opportunity for researchers from all three campuses to connect and strengthen the research community throughout the BC Interior.



Researchers developing probiotic cocktail to combat deadly bat disease

A team of Canadian researchers are developing a new preventative treatment to combat a deadly disease that is decimating bat populations by taking a cue from human probiotics.

Think yogurt for bats.

The new treatment, which is being developed by Thompson Rivers University's Dr. Naowarat (Ann) Cheeptham, along with Dr. Cori Lausen of the Wildlife Conservation Society (WCS) Canada and Dr. J.P. Xu of McMaster University, uses the principle of probiotics—introducing “good bacteria” that are helpful to the body—in order to prevent the fungal infection that causes White-Nose Syndrome (WNS).

“Here in western North America, bats behave differently in winter than they do in the east, and so we are working on a disease treatment that will work in the west, but help bats across the continent,” said Lausen.

The three-year project is funded in part through a research grant from the Bats for the Future Fund, a competitive program that supports the development of treatments for WNS to promote the survival of bats in North America.

Pseudogymnoascus destructans, the pathogen responsible for WNS, was first found on hibernating bats in New York in 2006. Known simply as *Pd*, it has since spread to 33 states and five Canadian provinces, and killed more than 6 million bats.

Pd thrives in cold, damp places, which makes the caves and mines where bats hibernate a perfect climate for its spores to grow. The fungus irritates the bats much in the way that athlete's foot irritates a human, causing the bats to wake and use energy that they need to survive the winter hibernation period. In the colder months, with food scarce, foraging often means death from starvation and exposure for these bats.

Probiotics fight off disease-causing microbes in humans and the scientists feel they can apply the same principle to bats. “To date, my lab has isolated 14 bacteria that inhibit the growth of the fungus”, said Cheeptham. “These microorganisms already occur naturally on some bats' wings.”

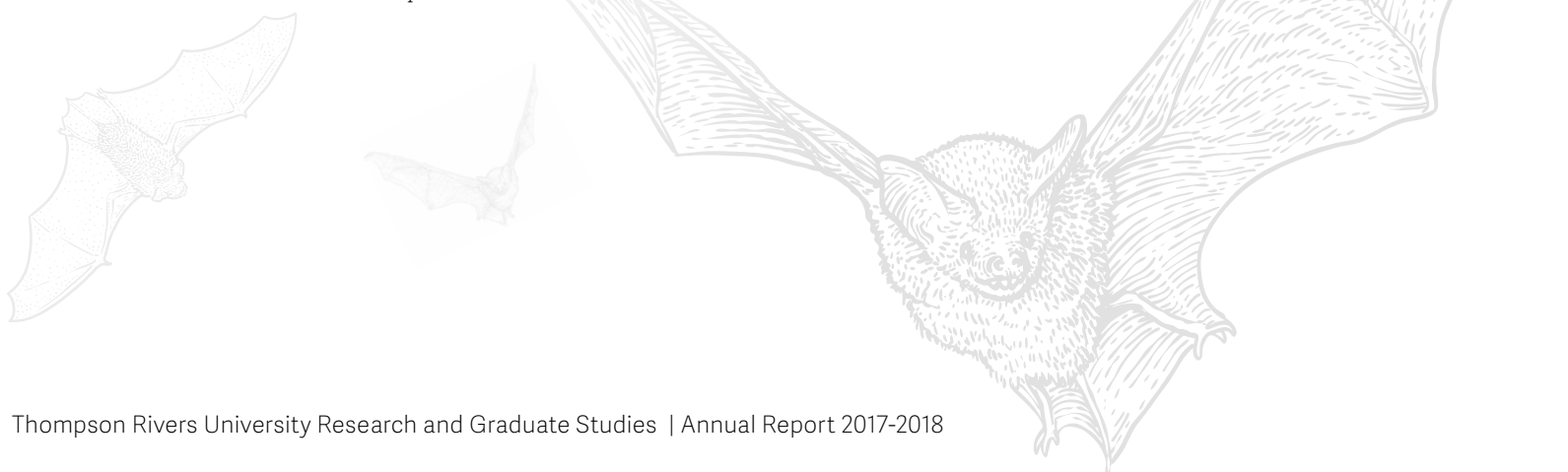
Lausen said the probiotic “cocktail” will be applied to the bats externally in a powder form while the night-fliers exit or enter their summer maternity roost.

“Unlike in eastern caves, where large numbers of bats overwinter together, our western caves and mines are largely inaccessible in winter, and most have been found to house few bats”, said Lausen. “So we are taking a unique approach to treat bats before they leave their summer roosts, many of which are in buildings widespread across the west.”

During the initial research, the team will conduct preliminary captive trials at the BC Wildlife Park in Kamloops, BC, before undertaking large scale testing and field trials with the South Coast Bat Conservation Society. With help from Micro Grants for Microbats, a probiotic applicator will be developed at the Vancouver house roost. As WNS moves into Vancouver (as is expected in the next year or two), Lausen said scientists will be able to see how well the treated bats survive WNS versus the surrounding maternity roosts in the city where bats will not be treated.



Naowarat (Ann) Cheeptham



Wounds: Beyond the battlefield

None of us go through life without a few scrapes and bruises, but fortunately most of those cuts heal quickly, with some barely leaving a scar.

But what about the wounds that never heal?

Dr. Nicola Waters, associate professor in the School of Nursing, has worked as a front-line nurse, and she's worked with industry. Now, as a researcher, she's familiar with many of the technological innovations being made within the area of wound care and the difficulties of moving many of those innovations into practice.

Waters' aim is to take the innovations in wound care from the science lab—or the bench—to the bedside, but bringing those advancements to the patients who need them moves at a glacial pace.

“It can take many years for an innovation to make its way to human trials. I’ve seen it from all angles. Knowing that there’s a good idea out there, and not being able to access it is frustrating.”

In the United Kingdom, wounds have recently been identified as one of the most costly health-care concerns, with expenditure estimated as roughly the same as for treating and managing cancer and depression. Waters and the wound research team intend to conduct similar research in Canada to shed light on how costly chronic wounds are to the Canadian health care system.

“The prevalence of chronic wounds has been predicted to increase dramatically in 10 to 20 years. The population is aging and more and more people are living with chronic disease, which involves wounds that heal slowly, or not at all,” she said.

Diabetic foot ulcers, venous leg ulcers, and pressure injuries have become increasingly common, yet the way these wounds are managed and treated remains largely unchanged, despite advances in technology.

“Historically, much of how wounds have been understood and taught has come from the battlefield, which are acute wounds on young, fit, otherwise healthy people. But methods for treating those wounds that are not expected to heal depend on increasing our understanding not just of the wound but also the underlying disease and the patient’s individual circumstances. We need a different approach, and innovations that can prevent wounds, or help them heal, are limited by the complexity of the issue.”

The newly formed cell and wound innovation and research collaborative between TRU and Interior Health (IH) aims to address these challenges.

Under Waters' direction, TRU and IHA will host the International Conference on Skin Integrity and Tissue Viability in April 2019, bringing together researchers and frontline clinicians.



BRIGHT FUTURE FOR BC WINES

In 1990, there were 17 grape wineries in British Columbia; today there are more than 275, and while the industry shows no signs of slowing down, it faces numerous challenges.

Extreme weather, which brings with it wildfires and droughts, is just one challenge facing wine producers in the Thompson Okanagan. Earlier this year, Dr. John Hull co-chaired the Wine and Culinary Tourism Futures Conference, bringing together academics with industry professionals from around the world to address the pressures in this growing regional industry.

“By working together, we can share best practices and adapt to bring better resilience in the industry,” said Hull, associate professor of tourism.

Hull, whose previous research focused on mountain tourism, says he’s fascinated by rural development, rural resiliency and evolutionary economic geography.

“We see the mountain environments attracting a lot of people in our region, and we see huge changes in the economy of the BC Interior with much of our agriculture focus shifting to vineyards. I’m interested, as a geographer and a tourism researcher, in the evolution of the development of these areas, and how wine and food is a critical part of the experience,” he said.



Stephanie Winton

STAYING SNAKE AWAKE

Stephanie Winton isn't scared of much—least of all snakes—and if she was ever afraid of public speaking, she has conquered that fear.

The Master of Science in Environmental Science student became a sought-after snake safety expert this spring when she starred in a TRU-produced public safety video. Winton's research focuses on road mortality of the Western Rattlesnake, and she found that it is a significant contributor to the snake's population decline.

Her research takes her into the grasslands of the Southern Okanagan and because she spends so much time on the snake's turf, she was the perfect person to provide safety tips to hikers, dog-walkers and mountain bikers.

Within a week of the video airing across TRU's social media channels, Winton was approached by several radio stations, newspapers, a school group, and even one local realtor who invited her as a guest on his weekly podcast.

Her advice? "Be aware of the issues. Educate yourself, and if you're out driving, go the speed limit, pay attention and look for snakes on the road, especially at dawn and dusk."

Supporting early childhood educators in the field

More than half of all early childhood educators (ECEs) leave the profession within five years.

The reasons are varied, but often come back to difficult and demanding work, low wages, little support, and few opportunities for professional development.

The Government of BC has committed to the creation of thousands of new, licensed childcare spaces, but has identified recruitment and retention of professional Early Childhood Educators as one of the most pressing challenges to developing universal child care.

It's this challenge that drives Dr. Laura Doan's research, pushing her to find ways to support ECEs, and reduce that turnover.

Supported by Make Children First Kamloops, Doan reached out to the ECEs themselves to determine what they need to feel valued and supported in the profession.



Laura Doan

"I want to come from a place of respect by involving these professionals directly in their research."



Doan's outreach included interviews and focus groups, as well as the facilitation of professional development and peer mentoring opportunities. She also created a private Facebook group for those in the field.

Results of the outreach were significant.

"Their own confidence in being ECEs rose, and there was a greater connection to community. They saw value in coming together with other educators. There was an increase in knowledge and skills," she said.

Now with additional funding, Doan is excited to continue her work within the local ECE community, and hopes to broaden her research provincially.

"The study participants said they wanted more online support. They are very busy and have very little downtime, which is why they asked for a Facebook group to create a community of practice," she said.

Creating opportunities for professional development in the field is essential, but challenging, considering the long hours required by ECEs, and the limited time off they receive.

Doan and her research assistant schedule professional development outside of the regular work week, provide childcare, and offer livestreaming.

"We're trying to make it as accessible as possible. My research is grounded in determining what ECEs want. They know what they need, and I want to come from a place of respect by involving these professionals directly in the research, and valuing their contributions."



PUTTING HIGHER EDUCATION IN ITS PLACE

In higher education, does place matter?

That was the research question that formed the basis of a five-year experiment into place-based education at TRU. The results of this experiment can be found in the 15th *Green Guide, Place-Based Education: An Inter and Multidisciplinary Approach*, published by the Society for Teaching and Learning in Higher Education.

The guide, authored by TRU faculty members Dr. Lyn Baldwin, Dr. Nancy Flood, Dr. Kim Naqvi, Ginny Ratsoy, and Elizabeth Templeman, is described as a toolbox for post-secondary educators to incorporate place and place-based learning methods into curriculum.

It became clear to the team that more effort needed to be made to educate students about the place that they had come from, and the place that they had come to learn.

"The best way to understand other people and other places is to be on intimate terms with your own," said Baldwin.

Above (left-right): Lyn Baldwin, Kim Naqvi, Nancy Flood, Elizabeth Templeman, and Ginny Ratsoy.

Chemistry converts garbage to gold

Biomass generators take byproducts from wood processing plants and convert them to energy, and while the power produced is considered green, there is still waste left behind.

But what if that waste could be turned into something useful, like a fertilizer?

That's the question an industry partner put to chemistry professor Dr. Kingsley Donkor, who immediately went in search of an answer that would divert this material from the landfill, while also creating a product that has benefit to industry and to society as a whole.

"The idea was to see if we can use this waste, called fly ash, to do something for us, something of benefit," said Donkor.

"People, especially people in developing countries, generate a lot of this fly ash, and what we're trying to do is make it useful, and make it a fertilizer."

Supported initially by an NSERC Engage Grant, Donkor conducted preliminary research in his lab at TRU, and the results were encouraging.

"We were so excited in the lab when we saw these results," he said.

He and his team of researchers and industry partners then successfully applied for an NSERC Collaborative Research and Development (CRD) Grant valued at nearly \$350,000—making this the first CRD that has ever been awarded to TRU.

The grant allows his team to take the research out of the lab, and apply it on an industrial scale.

Fly ash contains many of the nutrients that crops need to grow, including calcium, sodium, potassium, magnesium, potash, and phosphate.

The problem is that fly ash has an extremely high pH, and can't be applied directly to the soil without killing all of the plants.

"We amended the pH, meaning we were able to decrease it by applying elemental sulphur. Now we're transferring this knowledge into the field on a large scale, where we're going to apply lots of elemental sulphur on the fly ash, and then spread this fertilizer over a 400-acre parcel of land," said Kingsley.

An NSERC CRD requires industrial partners, in this case Louisiana-Pacific, which provides the fly ash from its biomass plant, and Kingsclere Ranch, which has offered up the 400 acres. Both partners are based in Golden, BC.

The bulk of the fieldwork is being conducted by research associate Dr. Garrett Whitworth, who is overseeing the application of the elemental sulphur, and taking samples and monitoring soil health throughout the research project.

Using an Unmanned Aerial Vehicle, Dr. John Church, co-investigator and BC Regional Innovation Chair in Cattle Industry Sustainability, will monitor crop health and vegetative stress over the vast tract of land. Donkor expects results from the study as early as December 2019.

"This concept can be transferred all over the world. It's quite novel. People, especially in developing countries, generate a lot of this fly ash, and what we're trying to do is make it useful, and make it a fertilizer."



Kingsley Donkor

Little lives enriched by research

When you hear the word “research,” often it’s the big-ticket items that come to mind—the medical breakthroughs and the technological innovations.



But there is research happening right now, in cities across Canada, that is impacting our neighbours, families and friends. And often this research, while transformational in the lives of so many, goes on without notice, or celebration.

An example of projects that can have huge impact on the most vulnerable people in our community can be found in The Falcon Program.

A collaboration between TRU, the B.C. Ministry of Child and Family Development, the Boys and Girls Club of Kamloops, the Thompson-Nicola School District, and other community partners, The Falcon Program is designed for children aged five to seven years old with a history of trauma who have difficulty participating in a regular classroom setting.

Research is led by Dr. Rebecca Sanford, lecturer in the Faculty of Education and Social Work, and supported by TRU's Research Apprenticeship Program.

The Falcon Program has been years in the making, and something Katherine Gulley, Clinical Supervisor for Child and Youth Mental Health, has long envisioned. But it took all the right people, at the right time, to come to the table to bring the program to fruition, and the first cohort of children completed the program in June 2018.

Children were identified to participate based on their needs. All of the children in the program have been exposed to adverse childhood experiences, including neglect, emotional, physical, and/or sexual abuse, and/or household dysfunction—which might include incarcerated parents, parental death, parental substance abuse or parental mental health issues.

These children often fall through the cracks of the system, as they don't necessarily meet the criteria for mental health or developmental services. They are children with complex needs, but no official diagnosis or designation.

"The idea was to collaborate to develop a trauma-informed program for these kids, to help them become more regulated, and to meet their social and emotional needs," Gulley said, adding that the ultimate goal in the development of this program is to see the children transition back into a regular classroom.

Sanford was recruited due to her background in child welfare-related social work, and worked with Gulley and Trish Smillie, Director of Instruction for the Kamloops Thompson School District, to develop the terms of reference and the programming model.

The trio reached out to Kerry Woehle, Manager of Program Operations for The Boys and Girls Club of Kamloops, who agreed to provide funding and space, and Robin Collins who provided weekly equine therapy at Copper Hills Equestrian Centre owned by Rick and Ann Wallin.

The Boys and Girls Club is mandated to fill in the service gaps for children in the community, and had space available for the program during school hours.

"We have some experience working with children with trauma history, so these

children fit within the demographic that we already serve," said Woehle.

What interested her in all this was what the research brought to the table. As a not-for-profit group, it's essential to evaluate programming to ensure its future viability.

Supported by TRU's Research Apprenticeship Program, the Falcon Program has been years in the making...

"The research will help to secure funding, and it proves there's value to the work we're doing. I think sometimes when you're in it, day-to-day, you forget to stop and sit back and see what impact you're having, but by collecting this data, you're able to see some tangible reflection of the growth."

Much of that growth came from the inclusion of equine therapy, something the program will continue to accommodate.

"For a lot of kids who struggle in relationships, creating these relationships with horses provides great feedback. It's subtle, but it's profound in what the experience with the horses has done for a couple of the kids in the program," explained Gulley.

"There's nothing that doesn't excite me about a program like this because we're meeting the needs of kids that have traditionally not been met, and by doing it so early, we can potentially affect their trajectory," she said.

Data collection was embedded in the program design, which is unique as it makes future research self-sustaining.

The data is being analyzed by Sanford and a Research Apprentice with a focus on both process and outcomes. Outcome measures include resilience and coping skills, placement stability, caregiver factors, and the transition to the traditional classroom. The process measures are used to ensure fidelity to the program model and the guiding principles of the program which include safety, connections, regulation, collaboration,

flexibility, cultural humility, and resilience. It is this data that enriches the program, and ensures that it can continue, grow, and hopefully someday be replicated in other communities in British Columbia.

"This is unique. There's currently no way to intervene with these kids early on in

the education process. There's alternative high school, but there's so much time lost before that. Hopefully with programs like this, fewer children will require those alternatives when they get older," Sanford said.

The program has been such a success that it is scheduled to continue again through the 2018-19 school year, this time expanding to include intermediate students.

A COMMUNITY EMPOWERED BY RESEARCH

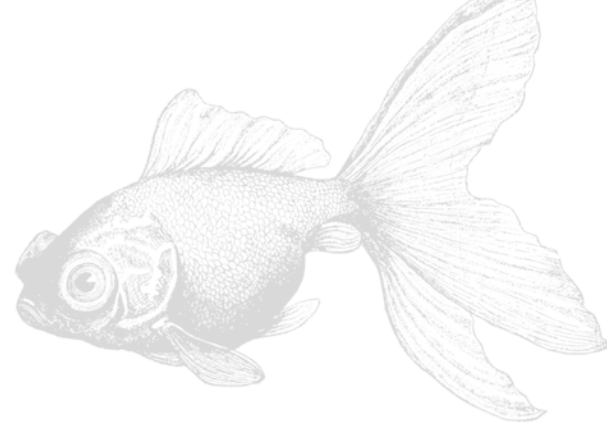
In 2016, TRU and the United Way Thompson Nicola Cariboo embarked on an innovative partnership designed to facilitate the exchange of knowledge between faculty and student researchers and the community.

Out of this partnership came the Community-Driven Research Fund designed to support research that responds to community needs, and to provide opportunity for students to become involved in community-based research.

To date, 17 projects have received funding for an institutional commitment of more than \$40,000.

"The role of the university within the community is being redefined," said Dr. Will Garrett-Petts, Associate Vice-President, Research and Graduate Studies. "Today's universities are not separate from the communities in which they exist, but are in dialogue with them."

Goldfish— an innocent-looking enemy



Dr. Brian Heise admits that he had always turned up his nose at goldfish.

What's the point of these boring, brownish-yellow things when there are so many more interesting fish in the sea (or the lake)?

"I always thought they were the lowest of the low fish, but they're not boring at all," the associate professor of Natural Resource Sciences said with a laugh. "They're the only animals on the planet that can go for four months without oxygen!"

While goldfish are fascinating, they're also distressing, especially if you're an expert in invasive species. Goldfish are showing up more and more often in our lakes, they're competing for the same food as native species, and out-reproducing them by a wide margin.

"A single female goldfish can populate a whole lake. She steals sperm from other species and produces clones of herself.

It's like science fiction. They're really amazing fish," Heise said, quickly adding that they're fish he wishes would stay out of lakes, and stay in tanks and ponds.

The aquatic ecologist and Chair of the Invasive Species Council of BC, became interested in goldfish when they began turning up in lakes that are home to rainbow trout.

People have dumped the contents of their aquariums and backyard ponds into White Lake near Salmon Arm, and Dragon Lake near Quesnel, both of which are stocked with rainbow trout by the Freshwater Fisheries Society of BC. Heise is currently assessing both lakes to determine the risk of invasive fish to native trout populations, and is also working with TRU microbiologist Dr. Jonathan Van Hamme to understand the genetic make-up of the invasive fish.

"We really don't even know if they're goldfish. They're not golden anymore—they turn a brown, or brown and white checkerboard colour—and they might be Prussian carp. We're looking at the genetics of the fish to see what species we actually have in our lakes."

Like most invasive fish, goldfish are big eaters, and tough to kill.

"They can handle freezing for short periods of time, and they can handle difficult conditions much better than our rainbow trout can. They love it here."

The goal with this research is to gain a better understanding about the extent of the problem, and once that's established, to develop an action plan for addressing it, one that includes both culling the population, and educating the public about the dangers of releasing goldfish into the wild.



Brian Heise

Skip the courts: Research improves access to justice

Resolution in court is often unattainable for a variety of reasons. Many people give up because they live in a remote part of the province, or determine that the conflict will cost more to litigate than what they'd get in return.

And if the average person does continue, but opts to represent themselves, they're often at a disadvantage in a system built for lawyers and judges.

Canada's first online tribunal, the Civil Resolution Tribunal, or CRT, was designed to put an end to these dead-end scenarios. Launched in 2016, the CRT has handled more than 6,000 disputes.

The pioneering system can help resolve strata disputes and small claims of \$5,000-and-under in a timely, cost effective way. And collaborative approaches to dispute resolution are encouraged along the way.

Katie Sykes' passion for BC's online CRT platform is palpable.

"Everything is there, you can use this resource at 3 a.m. in your pajamas if you want to. You begin with a user-friendly quiz to find out how to get started, what you need, and if your case is really viable," said the associate professor in TRU's Faculty of Law.

"It's a simple and accessible way for people to access the knowledge and tools they need to understand their legal situation better. In many cases that can be enough to help people solve a legal problem without needing dispute resolution."

Sykes is dedicated to improving access to justice, and is eager to see similar models used elsewhere. Other jurisdictions, including Quebec, Ontario, and the UK, are exploring the potential of online courts to improve access to justice. The goal of Sykes' current research is to inform these systems, allowing them to develop and progress.

"Now that it's been here for a few years, we have data, and we have all kinds of data we wouldn't normally see. Traditional courtroom reports only capture the cases that are resolved and finalized, and everything that happens up to that point is not collected.

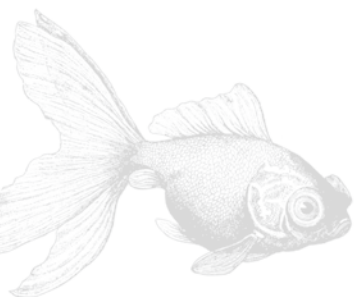
Supported by a SSHRC Insight Development Grant, Sykes will survey and interview those who have participated in the CRT, to find out what worked and what didn't, why they used it, if they might use it again, and if they'd recommend it.

"Many professionals working in the legal field do not even know this exists. And it could help a lot of people. If people knew this was in place, they might be more empowered to pursue their rights rather than giving up."



Katie Sykes

Earlier this spring, the Government of BC introduced changes that, if adopted, will broaden the CRT's jurisdiction to include certain motor vehicle accident claims, as well as disputes involving non-profit societies and co-operative associations.





Tom Pypker

Going with the hydrologic flow

When rain falls on tree canopies, chemical reactions occur and 20 to 30 per cent of the water headed for the ground never makes it. Many questions are still unanswered about how branches, leaves and needles affect rain, from the sky to the water table.

Dr. Tom Pypker, associate professor in Natural Resource Science, focuses his research on understanding the relationship between canopy structure and hydrologic flow paths.

Supported by an NSERC Discovery Grant, Pypker analyzes water, soil and lichen samples in a variety of locations within the Southern Interior, looking at all types of shrubs, trees and grasslands.

“Water falls on the vegetation, and leaves, branches and needles reroute the water and alter the chemical composition of the water. There is a lot to understand about how ecology and the water table are affected by the canopy. If we have concerns about water availability now and in the future, we need to know where it’s going,” said Pypker.

His goal of improving our understanding of how vegetation alters, and is altered by, the path of water through the atmosphere-plant-soil continuum comes from a pure interest in how vegetation affects water movement.

Previous research saw Pypker developing new tools for monitoring snowpacks over large tracts of land at high elevation ski resorts. How canopies affect snow and snow melt, is tied with this new project, and lessons learned from past work using Unmanned Aerial Devices (UAV) equipped with long- and short-wave radiation to measure snowpacks are being applied to this study.

By better understanding the link between canopy structure and hydrology, scientists can better predict the impact of changing vegetation types on the hydrology of an ecosystem. One of the objectives of his research is to provide a framework for those who use models and want to use these findings for their own environments.

In turn, this will help us understand the link between the spatial distribution of vegetation communities and hydrologic flow paths across diverse ecosystems.

“We need to understand how hydrologic flow is affected by canopy in order to gain a holistic picture of what is happening from the sky to the stream. What happens to the water that falls on the trees at the top of the mountain affects the salmon in the bottom of the rivers.”

Developing health equity for refugee women

More than two years have passed since the first wave of Syrian immigrant families began settling in Canada, and Dr. Joyce O'Mahony wants to better understand how the mothers in these communities access and interact with healthcare.

The goal of the research program—boosted by a Michael Smith Foundation for Health Research Convening and Collaborating Grant—is to build partnerships and create opportunities for collaboration between researchers, healthcare professionals, immigrant support agencies, and policy makers in order to enhance health care services for Syrian women.

O'Mahony's research focuses on immigrant and refugee women's postpartum depression experiences, access to mental health care services, and intervention strategies for postpartum care. She is motivated by the need to further understand immigrant and refugee women's mental health, their social support needs, and their treatment preferences in order to provide culturally sensitive and equitable health care services.

Cultural differences, social stigma, language barriers, unfamiliarity or awareness of services, and low socioeconomic status are just some of the barriers in accessing mental health care.

Her experience as a community health nurse encouraged her to explore the everyday experiences of these women. She found women struggling with mainstream healthcare services who may have experienced inequitable care in the community.

"It is all about the quality of health and healthcare across different populations, in terms of who gets the services, the attention and who has the access. Economic insecurity, care-giving, family responsibilities, and experiences of domestic abuse, all influence the women's ability to access and use appropriate services. Gender as a systemic structural determinant interacts with deepening inequities associated with other socioeconomic determinants to impact access to care. Examining structural constraints provides a clearer portrayal of what is happening in the women's lives, which ultimately affects the women's healthcare behavior."

A successful symposium: "Supporting Emotional Well-being and Access to Healthcare of Syrian Mothers" was held in the Lower

Mainland this spring, with 60 participants creating a forum for an exchange of knowledge. Healthcare professionals, immigrant service agencies, school district representatives, non-governmental organizations—all who had experience working with Syrian

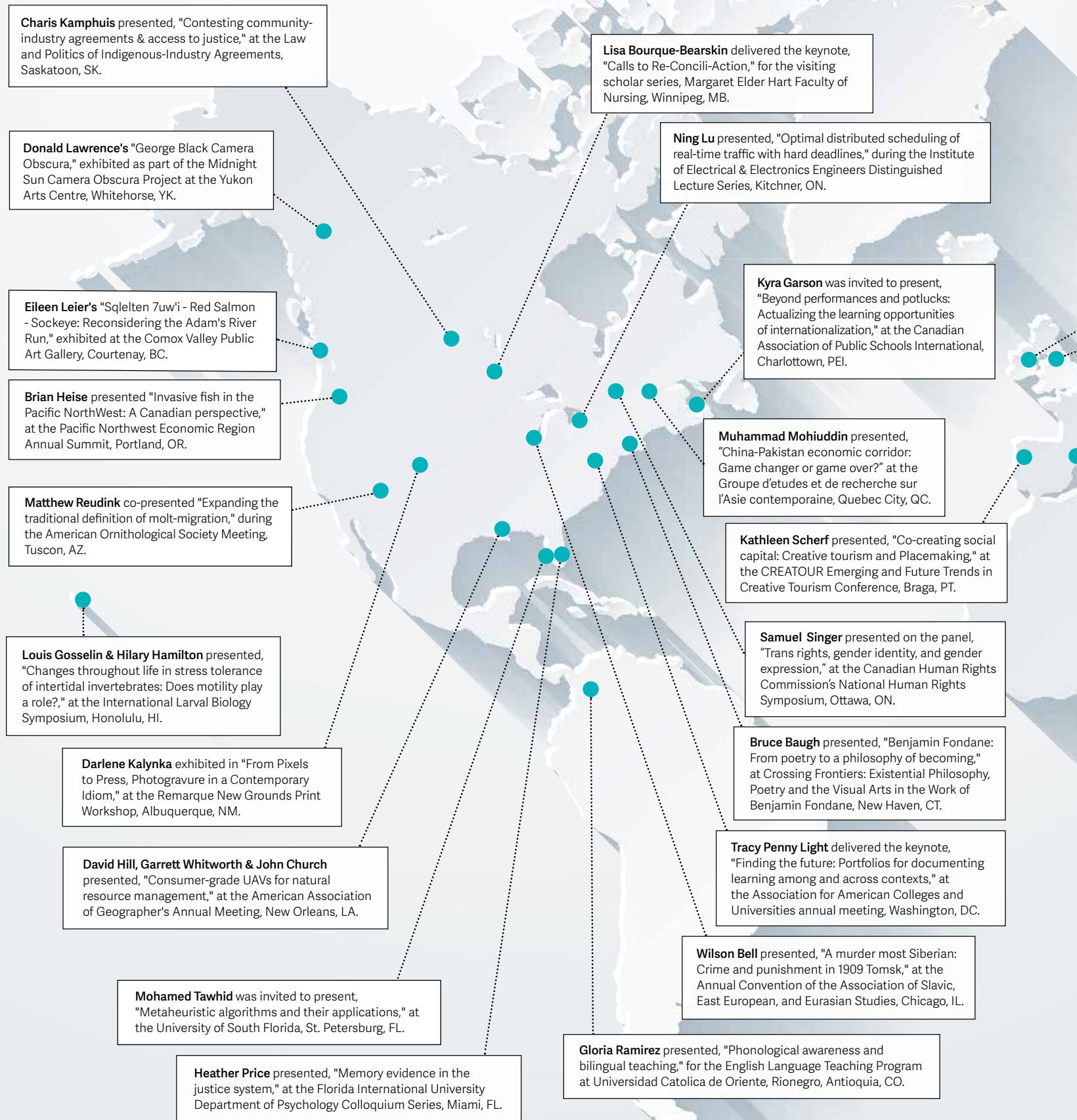


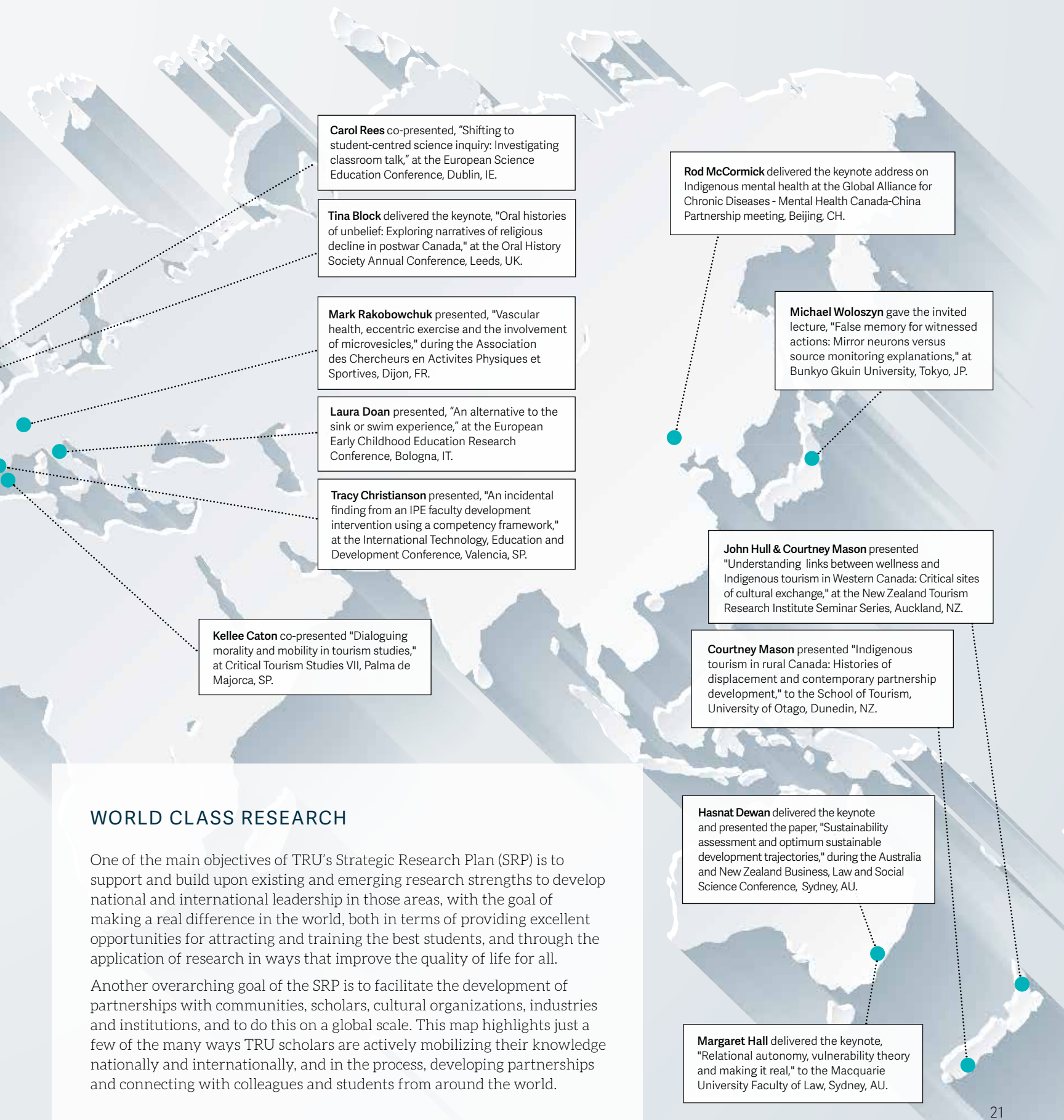
Joyce O'Mahony

refugee women—shared ideas and plans for activities regarding how to best support Syrian mothers.

From that symposium, an advisory board was created, consisting of Syrian mothers, settlement workers, health care professionals, non-government organizations as well as immigrant service providers. Through participatory action research, the board will hear from the community on the priorities to best support these women. Four advisory board meetings are planned in the coming year.

"We know that maternal mental health research is a public health priority due to its impact on both maternal and child health. Many mental health illnesses such as postpartum depression are highly treatable if caught early. Cultural differences, social stigma, language barriers, unfamiliarity or awareness of services, and low socioeconomic status are just some of the barriers in accessing mental health care. It is in society's best interest to assist those who are encountering these struggles to remove the roadblocks."





WORLD CLASS RESEARCH

One of the main objectives of TRU's Strategic Research Plan (SRP) is to support and build upon existing and emerging research strengths to develop national and international leadership in those areas, with the goal of making a real difference in the world, both in terms of providing excellent opportunities for attracting and training the best students, and through the application of research in ways that improve the quality of life for all.

Another overarching goal of the SRP is to facilitate the development of partnerships with communities, scholars, cultural organizations, industries and institutions, and to do this on a global scale. This map highlights just a few of the many ways TRU scholars are actively mobilizing their knowledge nationally and internationally, and in the process, developing partnerships and connecting with colleagues and students from around the world.



Hilary Hamilton

Gold medal awarded for cutting-edge marine research

Hilary Hamilton grew up in the Maritimes, so it's no surprise that she developed a passion for marine ecology.

But it might be surprising that upon completing her undergraduate degree at New Brunswick's Mount Allison University, she would find her way to Thompson Rivers University—miles away from the ocean—where she continued to study marine invertebrates including barnacles, crabs and snails.

While completing her Master of Science in Environmental Science, Hamilton sought to discover why natural mortality in marine invertebrates is so much higher during the juvenile stage than in the adult stage. Hamilton, the recipient of the 2018 Governor General's Academic Gold Medal, discovered that juveniles are much more vulnerable

to climate-related stressors, including heat and evaporation at low tide, and are much more likely to die from that stress than adults.

"Her findings have revealed a major mechanism controlling survivorship, and thus population abundance, of marine invertebrates; her findings also suggest how populations of coastal marine invertebrates could be impacted by climate change," said Dr. Louis Gosselin, professor and graduate supervisor.

For more than 140 years, Governor General's Academic Medals have recognized the outstanding scholastic achievements of Canadian students. This is the fourth time the medal has been awarded at TRU.

"Hilary's thesis work constitutes original, cutting-edge research, and a substantial contribution to her field," Gosselin said, explaining that this, along with her community outreach and near-perfect 4.24 GPA, made her an obvious choice to receive the award.

Hamilton began her MSc in June 2015 at a field station in Bamfield, BC, and didn't arrive in Kamloops until months later.

"It was an incredible experience studying and learning (in Bamfield). I liked how different the work was, and how it kept things so interesting," she said.

Upon defending her thesis in September, Hamilton returned to the Maritimes, where she now works as a science educator at the Discovery Centre in Halifax.

Students creating knowledge

Kevin Clyde got hooked on undergraduate research.

“In the early years of my degree the idea of doing research didn’t really occur to me, but since I started I really haven’t stopped,” said the 2018 Bachelor of Arts graduate.

Clyde completed a project funded by the Undergraduate Research Experience Award Program (UREAP), and then spent two semesters as an Undergraduate Research Ambassador, guiding peers on their own research journeys.

“It feels like we are really contributing to the research community at TRU,” he said.

“Doing research has truly changed my career path and how I view my education,” said microbiology student Breanne McCammond, another ambassador. “My mentor is a mentor, but he’s also a colleague and friend, and having that relationship makes all the difference,” she added.

This year, TRU was proud to host a three-day international symposium *High Impacts in Undergraduate Research: Establishing Inclusive Opportunities*. The symposium brought together some of the leading researchers in the field of undergraduate research to identify models and practices shown to promote the success of all students in undergraduate research, including those from historically underserved groups.

The symposium was made richer with the inclusion of six students from Bridgewater State University and eight students from TRU, who all shared their unique experiences as undergraduate researchers.

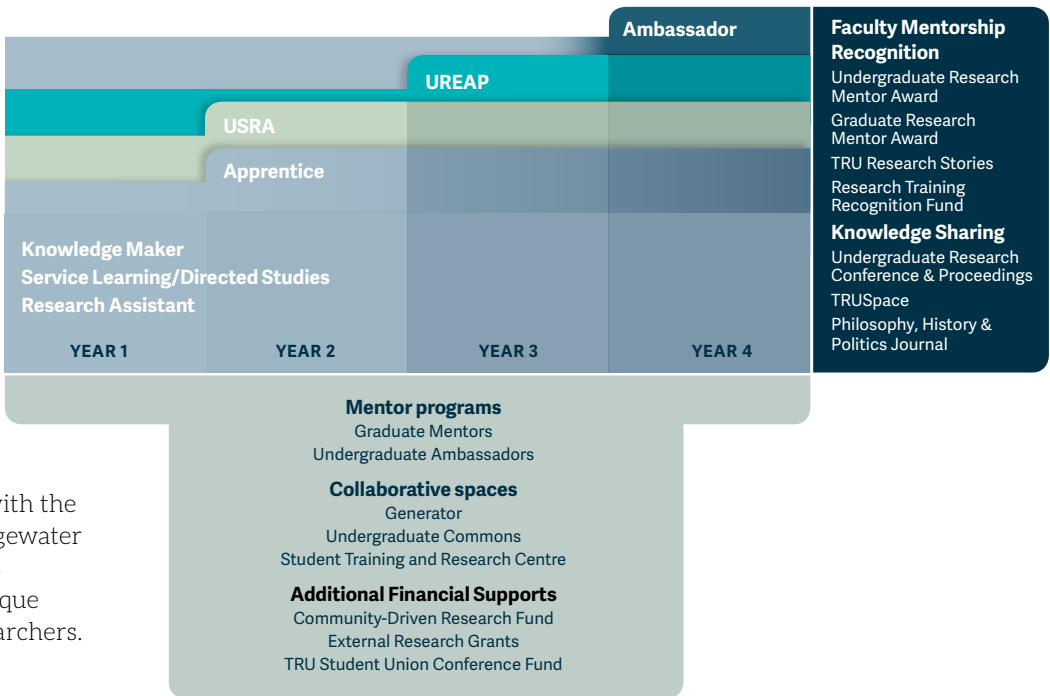
Many students are encouraged to participate in research in order to enhance their applications to graduate school, but according to Dr. Jenny Shanahan, Assistant Provost for High Impact Practices at Bridgewater State University, research experience assists post-graduation even if graduate school isn’t part of the plan.

Shanahan, who delivered the keynote at the symposium, identified main skills sought by employers that students gain from participating in research, including verbal and written communication, experience collaborating on diverse teams, ethical decision-making, and problem solving over long-term projects.

“Successful, diverse programs don’t happen by accident,” Shanahan said. “Any student who has a good work ethic and an authentic question should have a place to participate in research.”



Kevin Clyde



At TRU, there are more undergraduate research opportunities available than ever, from apprenticeships, and the Indigenous Knowledge Makers program, to the flagship UREAP.



Edward Howe

EDUCATION IS IN THE AIR

A series of three citizen science partnerships between the university and the community have materialized this fall, all of which were led by Dr. Edward Howe, associate professor in the School of Education. Two teacher candidates, a Mitacs Globalink Research Intern and several volunteers have assisted on the projects aimed at helping educate the public about air quality.

This research is being done in collaboration with representatives from TRU's Sustainability Office, Interior Health, Indigenous groups, local industry, and Kamloops Moms for Clean Air.

The first community-engaged research project underway is a partnership with the Big Little Science Centre, where a Purple Air monitor will be set up inside a small-scale model of the City of Kamloops. Children will interact with the model city by disturbing dust, increasing the fine particulate matter (PM2.5) and reading the real-time changes in air quality displayed by the monitor. The model will provide a hands-on interactive learning experience.

Continued on page 25;

Bringing Augmented Reality

Police line-ups are part of popular culture, but typically, popular culture has them all wrong.

For starters, live police line-ups are relatively uncommon in North America. Here, witnesses are typically presented with a series of photographs with the goal of identifying who they believe the perpetrator to be.

“By using Augmented Reality we can combine the benefits of a live line-up with the practicality of a video line-up for what we hope will be the best results possible.”

While live police line-ups are the norm in some countries—South Africa for example—they present significant logistical challenges, not least of which is finding eight people who look enough like the alleged perpetrator.

To improve upon the photo line-up, and eliminate the challenges of the live line up, the United Kingdom has standardized video line-ups, but Dr. Heather Price believes that with the technology currently available, we can do even better.



Heather Price and undergraduate researcher Nikola Klassen

to the justice system

Price, Canada Research Chair in Culture and Communities: Children and the Law, is working with Dr. Ryan Fitzgerald of the University of Portsmouth to develop police line-ups using Augmented Reality (AR). Fitzgerald is investigating the impact that the type of police line-up has on identification outcomes, and is also building up a repository of images for the newly designed software, while Price and her students are welcoming people to the Children and the Law Laboratory at TRU, running them through the program and collecting data.

"We've had 150 adults through the program so far. By using Augmented Reality we can combine the benefits of a live line-up with the practicality of a video line-up for what we hope will be the best results possible."

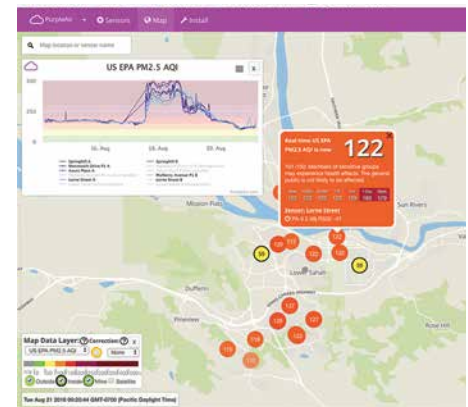
Price is one of a handful of experts in North America on memory and children as witnesses within the legal system, and has worked extensively with RCMP and other police departments on methods for the effective questioning of child witnesses. This latest research, she said, is motivated by two factors: Increasing the accuracy of eye-witness testimony, and easing the burden on witnesses.

"Too many people are wrongly convicted on the basis of inaccurate eye-witness testimony. Anything we can do from a systems point of view to increase reliability gives me more confidence in the decisions that are made."



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"Purple Air monitors are sensitive and they are continuously collecting data. Collectively these monitors offer a value to what already exists—the government monitor downtown—we have one powerful monitor with a certain set of data and the Purple Air Network adds another dimension and more data," said Howe.



Purple Air Network

A teacher resource kit complete with lesson plan ideas is the second educational tool. Children learn about the sources of air pollution, how to prevent it, what particulate matter is, the size and impact it can have, what it contains, and how bad it is for health.

Finally, an educational website has been created with the support of TRU's Director of Learning Technology and Innovation, Brian Lamb, and tied in to the Purple Air Network with help from professor of geography, Dr. Michael Mehta. Mitacs Globalink Intern Akanksha Singh, has been working on the website to ensure it updates in real time, assisting people in and around Kamloops to make informed decisions about outdoor activities based on the current air quality.



Courtney Mason

Getting back outside

Helping to create inclusive sport programming and identifying the barriers to participation are essential for the physical and mental well-being of Indigenous youth, and Dr. Courtney Mason has found that the answers are right there, if you take time to listen.

“We are trying to understand what the challenges are from the perspective of the youth—listening to their voices opens a window that provides alternative ways to understand these issues,” said the Canada Research Chair in Rural Livelihoods and Sustainable Communities.

Mason is a co-investigator on the SSHRC Sport Participation Research Initiative grant led by University of Manitoba’s Dr. Leisha Strachan, entitled “Cultural relevancy and positive youth development: Exploring the sport and physical activity experiences of Indigenous youth in Canada.”

The project was active in three Canadian cities—Winnipeg, Edmonton and Kamloops—and worked with urban Indigenous youth to listen to the participants and develop programs that respond to the issues they identify. During this time, Mason, along with undergraduate student Julie John and graduate student Kelsey Boule, worked with White Buffalo Urban Indigenous Services, to evaluate physical activity programs for young Indigenous women.

“Maybe there are unique ways for these communities to engage youth. Maybe there are already successes, and identifying the successes is just as important as recognizing the key barriers youth encounter,” he said.

“When we focus too intently on the barriers we miss some of the ways we could be enriching what is already there.”

Faculty, students and the program facilitators worked together to develop programming, building two, eight-week sessions in each city. The sessions ended with a sharing circle, during which the participants offered their ideas and expanded on their experiences.

“We learned that there’s a distinct difference in the role that family plays and that culture plays when it comes to fitting into what can be seen as a largely Euro-Canadian system,” Mason said, explaining one of the barriers to participation.

“When we focus too intently on the barriers we miss some of the ways we could be enriching what is already there.”

“We need to use the results from these studies to show where additional program development and related funding is required. This is one way to build up resources, and it’s important to the communities as they use these results to improve their programs, build capacity, and establish relationships with potential funders.”

Brand communities for a more informed society

Brand communities have existed for decades, formed on the basis of an attachment to a product or service and resulting from the connection between brand, individual identity and culture. In the past two decades, the Internet has enabled significant growth of these commercial communities.

Dr. Matti Haverila, professor in the School of Business and Economics, is focusing his research on what drives people to participate in a brand community.

Funded by a SSHRC Insight Development Grant, the research will first model the constructs of these communities and categorize them into defining groups: high- and low-involvement products and services. For example, a group of car enthusiasts sharing driving videos will be marked as high-involvement, compared to a community of people who all share the same benevolent attitude towards a specific breakfast cereal, with a simple "like," as a low-involvement community.

Secondly, the types of community members will be analyzed. In many scenarios, "lurkers" make up most of the community, at roughly 85 per cent. Lurkers enjoy the brand, they have a general interest and might occasionally post. The other two categories round out the community as "posters" and "active posters," with the latter living the brand and checking in on the community ritualistically.

The research, explained Haverila, "will define the communities and then the consumer behaviour. The differences between constructs of the communities and makeup of the posters, active posters and lurkers is important for brand community managers, if they want to know how they can reconstruct their community."

Not only will this roadmap be helpful to brand community managers, it's also advantageous for consumers. Purchasers are now able to do their own research and become informed about products and services by virtue of these communities, before they spend any money.

"Better communities equal more informed consumers. Do your own research, get information on new products, read real reviews. This all makes for more informed decisions and more transparency in organizations."

Haverila will spend the next two years, working alongside co-applicant Dr. Caitlin McLaughlin, collaborator Julio Viskovich and Concordia University Ph.D. student Kai Haverila, conducting focus groups, interviews and distributing a web-based questionnaire throughout the US and Canada to a variety of high- and low-involvement brand communities.

When complete, Canadian companies will better understand how to leverage emerging technologies to utilize online brand communities to increase brand engagement and loyalty. Innovations to brand communities will continue to contribute to the social, economic and cultural well-being of Canadians, via improved and more informed purchase decision making processes.



"Better communities equal more informed consumers. Do your own research, get information on new products, read real reviews. This all makes for more informed decisions and more transparency in organizations."

—Matti Haverila

International law: Research tackles same-sex unions, surrogacy and adoption

International migration, technology and human rights norms have changed the nature of the family. While Canada and other countries have legalized same-sex marriage, and regulate surrogacy agreements, other countries (including many in Commonwealth Africa) have not followed suit. This state of affairs has left in its wake complex cross-border legal questions.

For example, will a Canadian same-sex couple that moves to South Africa be considered married? How might this impact their estate planning and inheritance? Will the parents of a child born out of a surrogacy agreement in the US be recognized as such when they move to Kenya? How might that affect the rights of the child in Kenya? Or, will the child of a Nigerian same-sex couple resident in the United Kingdom be allowed to inherit their parent's estate in Nigeria?

A negative response to such questions can lead to a situation in which one is married in one country, but is considered unmarried in another, or a situation in which a child is considered legitimate in one country, but illegitimate in another. In a more extreme situation, a person may face the risk of being stateless, parentless or childless.

These are the questions that drive Dr. Richard Frimpong Oppong's research program, which was recently awarded a four-year SSHRC Insight Grant.

The project, "International Dimensions in Family Law: Same-Sex Unions, Surrogacy and Intercountry Adoption in Commonwealth Africa," expands on Oppong's previous research on private international law in Commonwealth Africa.

"With international migration, advances in technology, and greater respect for human rights norms around the world these issues are becoming increasingly important," said the associate professor in the Faculty of Law. He added that most African countries have not addressed the cross-border legal questions that have arisen around same-sex unions, surrogacy and intercountry adoption.


"My aim is not to examine the domestic laws in the six countries that I'm studying (Ghana, Kenya, Namibia, Nigeria, South Africa and Uganda), but only the international aspects. For example, I'm not going to be examining whether two people can marry in Ghana, but if two people marry in Canada and move to Ghana, will their relationship be recognized?"

Same-sex marriage, surrogacy and adoption are all distinct institutions, but Oppong is studying them together, mindful of how connected they are within the international legal context.

"These questions are not just academic. Ultimately, they will have very significant legal and personal consequences for the individuals involved," explained Oppong, who was inducted into the Royal Society of Canada's College of New Scholars, Artists and Scientists last year.

Dr. Oppong suggests that the findings from his study will become increasingly relevant in the years ahead, as many more countries move to regulate the three institutions.



A portrait of Richard Oppong, a Black man with short hair and glasses, wearing a dark suit, white shirt, and a red tie with white polka dots. He is looking directly at the camera with a slight smile. The background is a blurred indoor setting with light-colored walls and a window.

“These questions are not just academic. Ultimately, they will have very significant legal and personal consequences for the individuals involved.”

Richard Oppong



David Archie (left) and Rod McCormick (right)

What's in a name?

According to Dr. Rod McCormick, receiving a traditional name can bring strength, resiliency, history, identity and hope.

And for young people, and in this case, young Indigenous people, self-esteem is wrapped up in identity. Receiving an Indigenous name—sometimes the name of an ancestor—brings with it a new-found sense of responsibility, of connection, and engagement.

Working in partnership with the Secwepemc Health Caucus, McCormick and a team of community-based researchers are looking inward to find healthy ways forward for Indigenous communities through Tsexmin, which means looking glass, or mirror in the Secwepemctsin language, and is a unique CIHR-funded community-based research project.

The research team, which includes research assistants from within the community, is exploring traditional identity ceremonies that facilitate a sense of connection, including naming, fasting and hunting ceremonies.

McCormick, the BC Regional Innovation Chair in Aboriginal Health, is recognized as an international expert in Indigenous mental health, and has spent his career focusing on research

that involves Indigenous youth suicide prevention, career and life counselling and Indigenous mental health. Two years ago, McCormick approached David Archie, the Traditional Wellness Coordinator for the Secwepemc Health Caucus to identify aspects of traditional healing that the community would like to explore. Archie identified the impact of identity ceremonies on community youth as a priority.

“For young people, identity is huge. Self-esteem is wrapped up in self-identity, and connection is key. If a person has friends, a job, a place to live, then they’ve got a lot, and in receiving an Indigenous name you strengthen your sense of belonging and of connection,” explained McCormick.

The value of a project like Tsexmin is in its community-driven nature. The research question was proposed by the

“Self-esteem is wrapped up in self-identity, and connection is key...in receiving an Indigenous name you strengthen your sense of belonging...”

“We wanted to look at the importance of receiving a name, and how that would impact their wellness throughout their lifetime,” Archie said, adding that several ceremonies have already been conducted, and participants have been interviewed about their experiences.

“I know that a lot of people—including myself—wanted to know what we did to be as strong as our ancestors. They were strong because they had a stronger sense of connection to their families, and to the land,” Archie said, explaining that these naming ceremonies help to establish those connections to both land and family.

Health Caucus, which will hold the research data at the project’s completion.

“This is a place where we did something relevant and valuable to us, and for the researchers, so that everyone involved in the project has the opportunity to get something of value to them,” said Archie.

Listening and learning from youth

The results of Dr. Bonnie Fournier's research are a bonus. The real value of her SSHRC-funded project, "What can we learn from rural youth? A community-based participatory research study," is in the research process.

Fournier, associate professor in the School of Nursing, will work alongside youth coordinators, youth co-researchers, and adult mentors in Armstrong and Kimberley, BC asking 14-18 year olds what they need in their communities to feel supported in their development. The goal is to explore issues youth face living in a rural community, identify solutions in order to take action to improve their lives.

"Youth are rarely asked to participate in shaping the services and programs that affect their lives, and often their involvement remains marginal and tokenistic," Fournier said.

"It's hard to be invisible in a rural community. Everybody knows you, your parents, and all of your business."

This project is an extension of Fournier's larger body of research, which has seen her supervising a youth-engagement project in Kamloops, and leading a Uganda-based research team working with orphaned, HIV-positive children. The move into rural Canadian communities is intentional, as the youth can often feel isolated from services, stigmatized, patronized, and unwelcomed when accessing services.

Living in a small community creates challenges around confidentiality, Fournier explained. The adage, "everybody knows everybody" is true for these young people, so when the counsellor's office is in the community centre, everybody can see you walk in.

"It's hard to be invisible in a rural community. Everybody knows you, your parents, and all of your business," she said.

And even getting to where you need to be is difficult, as transportation options in rural communities are severely limited as well.

These are just some of the issues Fournier's team will wrestle with, but she refers to what she and the adult mentors will do as "holding space," for the youth, allowing them to identify what is important to them, what is working well, and where



Bonnie Fournier

there are gaps. And her job is to support young people with the tools they need to express themselves creatively in whichever way they choose.

In the past, Fournier said youth have opted to express themselves through visual art, spoken word, or skits. They may all have different ways of expressing themselves, but as they engage in the process, their insights will be valued.

"They'll have ownership, it won't feel as if adults are telling them what to do," and in going through this process, they'll be building their own resources and capacities, she said.



Mateen Shaikh

Understanding how to break down data

How can society best use the big data it's been collecting for decades?

Funded by an NSERC Discovery Grant, Dr. Mateen Shaikh's research focuses on answering that question. Currently there are many ways to measure, find correlations and compare the information stored in data centres. But often this information is either very precise, resulting in micro details, or very imprecise, resulting in missing information.

Shaikh became aware that the same tools were being used for different problems in different fields, but there wasn't a lot of communication between researchers.

"Researchers are banging their heads against walls working on finding solutions that may already be available by combining the right formulas. Broadly speaking, the same approach to solving individual algorithms, which in turn solve individual problems, could be solving other problems."

Uniquely, the truncated data approach and methodology that he's developing will show that the imprecision of data behaves more like data that is completely missing. With a new method where the precision itself is being fed into the model, this single approach can automatically deal with missing, imprecise, or high-quality data in many different scenarios. This can be used to combine data that previously wouldn't be mixed together.

Shaikh is also using algorithms similar to what Netflix uses to make recommendations. These are similar to the mathematical formulas researchers can use to find the correlations between adverse drug reactions across a diverse population over many decades.

Shaikh anticipates creating open-source software for others to use, build on and edit as they like. Researchers can find the optimal amount of precision while analyzing past, current and future data from government databases, independent studies and industry.

He has specific applications in mind but is making the models generic enough that anyone with similar problems can use his work.

No Straight Lines an inventory of small city social assets

There's quality of life, and then there's "equality of quality of life," and it is this research that is at the very heart of *No Straight Lines: Local Leadership and the Path from Government to Governance in Small Cities*.

"The goal was to gain greater understanding of what it means to create quality of life in a small city, and it reveals and exposes a lot of the activities that go on within our community, and within our university," said Dr. Terry Kading, associate professor of political science, and editor of the recently released book.

No Straight Lines has been several years in the making, and is the first in the "Small Cities Studies in Community and Cultural Engagement," series, which is the result of a five-year partnership between TRU and the University of Calgary Press.

"...what creates equality are all those community organizations that engage with a city to address a range of social challenges..."

Contributors to the book include TRU faculty members Dr. Lisa Cooke, Dr. Dawn Farough, Robin Reid, Ginny Ratsoy, and Dr. Tina Block.

The need for research on small cities is acute, explained Kading. Under the new model of governance local governments and communities are responsible for addressing a greater range of social issues than in the past, and this focus on learning and

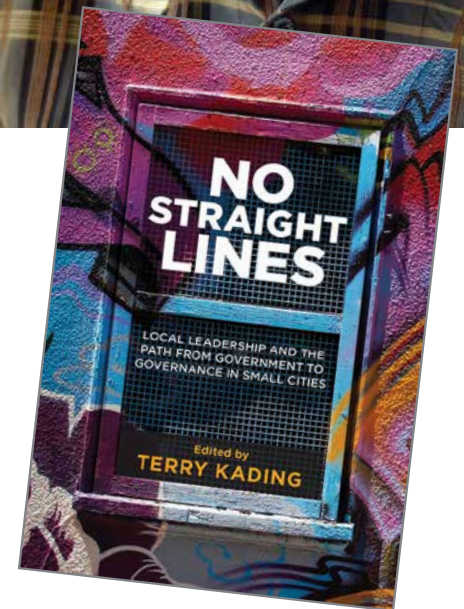
leadership provides insights into the issues and opportunities, and the challenges and advantages of doing so within a small city setting.

The small city experience is unique, he said, and while research and local governments will often focus on quality of life, what kept coming up again and again throughout the book, was the idea of "equality of quality of life" as a more inclusive model and set of ideals.

"You can have nice walking paths, and bike paths but what creates equality are all those community organizations that engage with a city to address a range of social challenges and to

create opportunities for a range of groups," he said.

The book creates an inventory of community groups and local responses to issues including homelessness, food security, aging populations, recovering local history, and also highlights the role played by the university within the narrative of the small city.



TERRY KADING QUOTED

"*No Straight Lines* captures the challenges that we face. You can have goals, and very detailed plans, but nothing in a small city unfolds the way you intend it to. The size of the organizations involved, the university and the unique insights everyone can bring to the table make it work, but we have our limitations."

Above: Terry Kading

Creating cannabis fingerprints

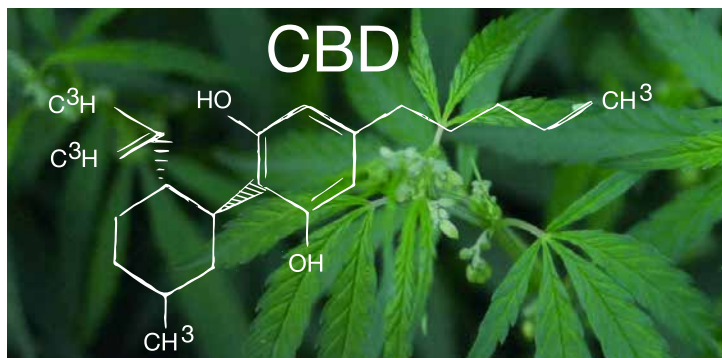
When you purchase extra-virgin olive oil from the supermarket, you know that the product has gone through an authentication process to be labelled as such, and the same will be true for cannabis products. Much like olives for oil, grapes for wine and beans for coffee, the chemical compounds that are found in a cannabis product depend on where, and under what conditions, the plants are grown.

A collaborative research project, between Valens AgriTech, Supra THC Services, Mitacs, the University of British Columbia Okanagan and TRU is now underway. This partnership explores the vast range of bioproducts that can be made from the plant, including pharmaceuticals, nutritional products, and industrial fibre, and how different strains, grown under different conditions, can be best suited for different applications in the consumer market.

The research project, dubbed the Cannabis Bio-products Toolbox was awarded a three-year \$330,000 Mitacs Research Grant, with \$90,000 allocated to the lab of Dr. Bruno Cinel, associate professor of chemistry.

“Just like an individual human fingerprint, each plant strain displays a unique set of ridges and valleys.”

“Everyone associates cannabis with THC, which is what gives you the high. The illicit market has been successful at creating strains for this over the past decades. However, there are dozens of other beneficial compounds in the plant, used in the treatment of cancer, Parkinson’s disease, anti-anxiety and pain management. We want to identify strains that are enriched in various combinations of these compounds, tailored to the needs of specific individuals,” explained Cinel.

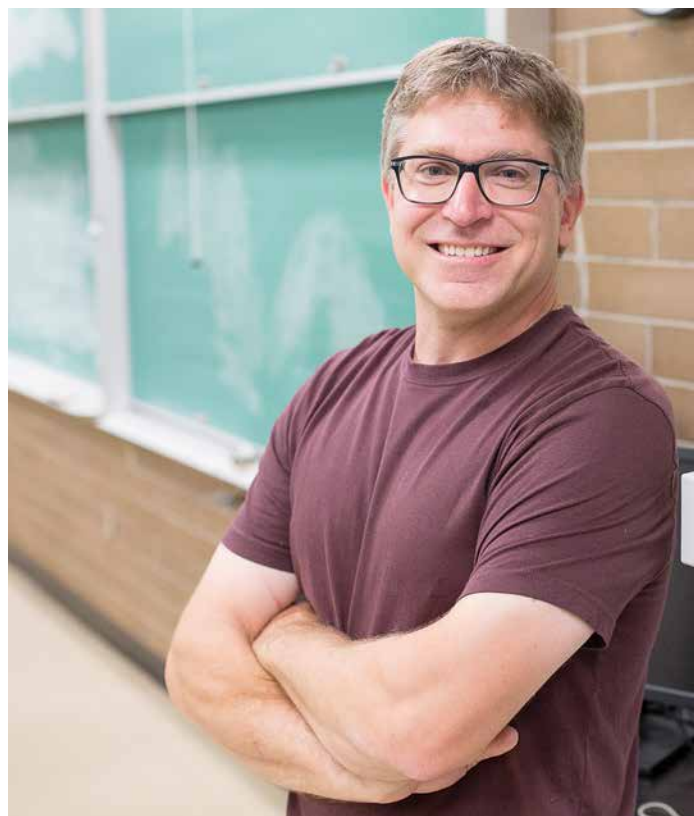


Cinel will use Nuclear Magnetic Resonance Spectroscopy to develop chemical fingerprints of the varieties of cannabis engineered by UBC Okanagan researchers. TRU is the only university outside the Lower Mainland with such a high-powered tool on site.

“Just like an individual human fingerprint, each plant strain displays a unique set of ridges and valleys. Plant extract is put into the instrument and a snapshot of all of the different components is taken. Very much like a barcode at the grocery store, the fingerprint authenticates what’s in there and at what levels very quickly.”

Hemp oil, for instance, can be found in any health food store because it has very beneficial ratios of omega fats. Knowing which strains provide more of those oils from the seeds, and what the different levels of those oils are, is a step in maximizing the beneficial ones.

As part of this partnership, Cinel, who is trained as a natural products chemist, has hired analytical environmental chemist, Dr. Ashish Sarker, as a postdoctoral fellow to join his research team at TRU.



Bruno Cinel

The algorithm of crime

Crime is something most people try to avoid, even if they do so subconsciously. Associate professor Dr. Andrew Park can attest to this after years of working with virtual reality, crime analytics and agent-based modelling and simulation.

More than 10 years ago Park created a virtual environment modelled after Vancouver's Downtown Eastside. He analyzed how those who entered the virtual environment made decisions, the routes they selected, and their interpretations—all with the intent of studying the fear of crime—which can be influenced by environmental cues, time of day, traffic patterns and even the weather. Also, working with TRU students, Park has shown how a 3D simulation system based on game technologies can simulate the decisions criminals make based on previous cases and existing crime data.

Funded by a SSHRC Insight Development Grant, Park is now developing a new framework for crime analytics. Vancouver Police Department (VPD) Sergeant and Criminologist, Dr. Valerie Spicer, joins him along with Dr. Herbert Tsang, a Professor at Trinity Western University who specializes in mobile app development. This research project focuses on crime analysis for the City of Vancouver.

Using the VPD's open source crime data, geographic information is layered over a map with traffic pattern information and seasonal data. Crime patterns and trends emerge from the map and data.

"We can get a bigger picture about why crimes might be happening at certain times and in specific places. We want to verify what we have found with practitioners and then develop a web-based tool, so anyone who is interested can see the information and make informed decisions," said Park.

Eventually the researchers hope to collect user-generated information through the app. If someone doesn't feel comfortable in an area, they report that information and the reason why.

"We can use this information to tell the police department to focus in on certain areas at certain times. Using these multiple layers of data, we can understand patterns of the crime and why some crimes are concentrated in certain areas," Park added.

"Sometimes the crime rate and fear of crime don't match. People could have an unnecessary fear of crime in a certain place. The map and app may also show locations that were previously considered dangerous and crime-ridden, but are actually not."

The first application of this project will be primarily for the VPD, crime analysts and urban planners, with the goal of better managing and strategizing around existing crime.

"I'm very interested in analyzing the data and then visualizing the data. It helps other people understand it as well, as many people are visual. Once we develop this, it can be applied to any city."



Andrew Park



STATE-OF-THE-ART SENSORS TAKE FLIGHT OVER BC GRASSLANDS

Dr. David Hill will be keeping a close eye on BC's fragile rangelands, thanks to support from the Canada Foundation for Innovation's (CFI) John R. Evans Leaders Fund.

Hill has been performing research with Unmanned Aerial Vehicles for several years, however, the state-of-the-art sensor payload, consisting of a Light Distance and Ranging (LiDAR) device and a hyperspectral imager makes the sensing system uniquely capable of addressing challenging questions in rangeland management.

Holistic rangeland management attempts to balance the objectives of increased food production, rangeland biodiversity, and carbon storage, in order to create a more sustainable food supply.

"Our goal is to create methods to accurately assess rangeland health from the air. Five years ago, this idea would have been considered crazy," Hill said.



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